

## REMARKS

In accordance with the foregoing, claims 11, 16, 21 and 30 are amended. No new matter is added. Claims 14, 15, 18, 20, 23, 25, 26 and 28 are cancelled without prejudice or disclaimer of the subject matter. Claims 11-13, 16, 17, 19, 21, 22, 24, 27, 29 and 30 are pending and under consideration.

## CLAIM OBJECTIONS

The noted informality related to claim 30 is corrected herewith.

## CLAIM REJECTIONS UNDER 35 U.S.C. §102

Claims 11, 12, 16, 23, 24, 27, 29, and 30 are rejected under 35 U.S.C. §102(b) as allegedly being anticipated by U.S. Patent No. 3,231,815 to Spencer \*hereinafter "Spencer").

Independent claim 11 is amended herewith to include features originally recited in claim 14, which is now cancelled without prejudice or disclaimer. No new matter is added.

Spencer discloses a particle detection apparatus using a fixed frequency circuit coupled to a resonant circuit to detect low concentration contaminants in a fluid (see Spencer's title and col. 1, lines 9-11). Spencer describes the device usable to verify purity of aircraft engine fuel, that is, to determine by counting the number of rust particles per unit of fuel (see col. 1, lines 12-32).

On page 10 of the Office Action, it is acknowledged that "Spencer does not disclose heating the sensor to a temperature above the ignition temperature of the particles to remove a particle load." (See the outstanding Office Action, Page 10, lines 3-4.) However, the Office Action takes the position that the above-identified feature (which has previously been recited in claim 14) is disclosed in U.S. Patent No. 6,003,305 by Martin et al. ("Martin").

Martin discloses a method for destroying soot in an exhaust stream from an internal combustion engine which includes heating a longitudinal tube disposed within a matrix of heat-resistant media, to an initial temperature above an auto-ignition temperature of the soot to initiate oxidizing of at least a portion of the soot (see claims 23 and 52 of Martin).

However, a person of ordinary skill in the art would not consider adding the heating related feature disclosed in Martin, to the Spencer device used in the flow of aircraft engine fuel, because an explosion would occur.

As Applicants have previously argued, Spencer's sensor does not collect the particles in the aircraft engine fuel passing through. In response to Applicants arguments the Examiner disagrees stating (referring to Spencer's device):

... the particles are passing through a sensor. After detection, the pulses resulting from the particles flow through the sensor are amplified and counted or averaged over a unit time to give measures of total contamination, or average contamination. Thus, particles are being collected to determine the particle concentration. (See the last four lines on page 2 of the outstanding Office Action.)

However, in Spencer, particles passing through the sensor are **not** collected, and counting pulses due to the passing particles is **not** collecting particles either. Merely juxtaposing features of Spencer's device to positively recited feature of claim 11 in the above-reproduced response to Applicants' previous arguments does not amount to a legally sufficient evidence supporting a *prima facie* case of anticipation or obviousness. In fact, in case of soot particles in gas as in the current application, Spencer's counting method cannot be applied because the number of particle is too large to be practically considered counting them.

Therefore, a rather collective effect in changing a characteristic variable is determined in the claimed method, the particles need than to be collected in order to measure their concentration.

Additionally, Spencer's device does not need to heating the sensor above the ignition temperature of the particles, because no particle load occurs as the impurities in the fuel are not collected but merely pass through. Spencer's device does not measure soot particles, but far larger particles of rust, sand or dirt (see col. 1, lines 16-23). Even if, only for the sake of the argument, one would consider that Spencer's sensor would accidentally collect some of the particles, the particles cannot be burned in a fuel flow by being heated above the ignition temperature because the fuel would likely also ignite.

Applicants respectfully submit that the Office Action did not meet the burden of proof for a *prima facie* case of obviousness relative to claim 14 (now amended claim 11), the alleged support to the rejection being merely a hindsight reconstruction without any deference to whether by incorporating features allegedly disclosed by the second reference (Martin) would render the device of the primary reference (Spencer) inoperable.

At least for these reasons, Amended independent claim 11 and claims 12, 13, and 29 depending from claim 11, patentably distinguish over the cited prior art.

Independent claim 16 is amended herewith to incorporate features previously recited in claims 18 and 20, which are now cancelled. No new matter is added.

In view of the above discussion of the prior art teachings, Applicants respectfully submit that claim 16 and claims 17, 19, 21, 22, 24, and 27 depending from claim 16, patentably distinguish over the prior art at least because the following features recited in claim 16 are not rendered obvious:

- a sensor in the gas stream, integrated as a capacitive element into the electromagnetic resonant circuit, collecting particles, having a nonconductive base body made of porous material and two electrodes spaced apart from one another and embedded in the nonconductive base body;
- a characteristic variable determiner determining change in a characteristic variable of the electromagnetic resonant circuit, the characteristic variable varying as a result of particle load of said sensor, from a reference value determined when said sensor is not loaded due to having been heated above an ignition temperature of the particles, where the characteristic variable is one of a resonant frequency of the resonant circuit and a voltage across the sensor when the resonant circuit is excited by the alternating voltage having a fixed frequency and fixed amplitude; and
- a heating device heating said sensor above the ignition temperature of the particles prior to determining the reference value of the characteristic variable.

Independent claim 30 is amended herewith in a manner similar to independent claims 11 and 16. Amended independent claim 30 patentably distinguishes over the prior art at least by reciting:

- a sensor in the gas stream, integrated as a capacitive element into the electromagnetic resonant circuit, collecting soot particles between electrodes of the capacitive element; and
- a particle concentration estimator estimating the soot particle concentration in the gas stream based on a change in a resonance frequency of the electromagnetic resonant circuit due to the collected soot particles in the sensor;
- a heating device heating said sensor above an ignition temperature of the particles to remove the collected soot particles from the sensor.

Claims 13-15, 25, 26, and 28 are rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Spencer and Martin. Claims 14, 15, 25, 26, and 28 are cancelled herewith

without prejudice. The claim cancellation renders the rejections directed to the cancelled claims moot. Claim 13 patentably distinguishes over the prior art at least by inheriting patentable features from claim 11.

Claims 17-19 are rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Spencer in view of U.S. Patent No. 5,447,076 to Ziegler ("Ziegler"). Claims 20-22 are rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Spencer, Ziegler and Martin. Claims 18 and 20 are cancelled herewith which renders the rejections directed to these claims moot. Applicants found no evidence that Ziegler corrects or compensates for the above-argued failure of Spencer and Martin to anticipate or render obvious all the features of amended claim 16. Therefore, claims 17, 19, 21 and 22 patentably distinguish over the prior art at least by inheriting patentable features from claim 16 from which they depend.

## CONCLUSION

There being no further outstanding objections or rejections, it is submitted that the application is in condition for allowance. An early action to that effect is courteously solicited.

Finally, if there are any formal matters remaining after this response, the Examiner is requested to telephone the undersigned to attend to these matters.

If there are any additional fees associated with filing of this Amendment, please charge the same to our Deposit Account No. 19-3935.

Respectfully submitted,

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